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Comparative Results of a State-Wide Use of Standard Tests and Measurements

Introduction

The following study is the result of a continuation of the coöperative research plan for the purpose of devising tentative State standards for the use of certain educational tests and measurements the October results of which were published in Extension Series, No. 27. The occasion, plan of work, and method of procedure were explained in detail in that bulletin, and need not be again reported here.

The work has been done under the direction of Dr. L. A. Williams, Professor of School Administration. The tabulation of statistics was carried on by Mr. L. L. Lohr, Jr., until he was called into the service of the United States, when the work was carried to completion by Miss Ernestine Kennette.

Method of Arrangement

The first set of tables gives the median scores for each grade for both the October and the May series of tests, and also gives the increase or decrease of the May results as compared with those in October. These tables are designated A^2, A^3, A^4, A^5. The table corresponding to Table A^1 in the previous report is omitted because so few schools made any report on the results in third grades.

Another set of tables appears as Tables B^1, B^2, B^3, etc., to B^{12}, which gives median results in each subject, grade by grade, for both the October and the May series of tests, and also gives the increase or decrease made in the score.

Table C summarizes the results and gives the May state medians which might serve as the tentative standards for attainment by the end of a school year for the several grades in the several subjects. Parallel to these scores is given the standard scores for purposes of comparison.

For further information another summary table, designated D, is given which summarizes the amount of improvement made in each subject during the year by the different grades. In this table there is shown the smallest amount of improvement, the median amount, and the greatest amount made by any system. This table may be used as a general sort of gauge by which to judge as to whether or not any given grade has made desirable or possible progress during the year in any one or more of the subjects tested.

As in the first report, results have been expressed for the most part in whole numbers and by the use of uncorrected medians. Lack of assistance has made such a course necessary.

The Grade Tables

For the sake of uniformity with the earlier report the first set of tables has been called the "Grade Tables." The following rubric has been adopted:

Columns marked

I—Speed reading test
II—Sense reading test
III—Language test
IV—Spelling test
V—Addition
VI—Subtraction
VII—Multiplication
VIII—Division

a—Rate
b—Accuracy
Oct.—Fall series of tests
May—Spring series of tests
Diff.—Increase or decrease in the spring scores over fall scores

The capital letters in the first column at the left designate the school making the score given under each subject. It was not possible, as before, to designate the rank of each school.

THE GRADE TABLES

TABLE A2—

	I			II			III			IV			V					
													a			b		
	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference
A	117	173	+56	4.2	6.8	+2.6	8	9	+1	70	61	—9	4	4	0	0	43	+43
B	152	164	+12	6.5	12.0	+5.5	9	13	+4	74	96	+22	5	4.5	—0.5	20	42	+22
D	140	206	+66	4.9	11.4	+6.5	8	10	+2	52	66	+14	4	5	+1	33	44	+10
E	69	164	+95	1.2	2.4	+1.2	6	8	+2	52	64	+12	3.5	4	+0.5	29	75	+46
F	132	169	+37	6.4	9.1	+2.7	10	11	+1	72	72	0	3	6	+3	33	60	+27
G	144	194	+50	8.5	9.8	+1.3	11	11	0	90	90	0	3	6	+3	50	50	0
I	143	170	+27	6.5	11.2	+4.7	9	11	+2	72	88	+16	5	6	+1	67	71	+4
J	156	197	+41	7.5	12.2	+4.7	9	10	+1	76	92	+16	6	10	+4	56	80	+24
K	172	169	—3	N.R.	11.2	------	8	11	+3	78	92	+14	4	6	+2	60	66	+6
L	56	137	+81	2.6	5.4	+2.8	6	9	+3	67	66	—1	3.5	4	+0.5	50	33	—17
M	127	157	+30	9.1	12.1	+3.0	9.5	11	+1.5	77	88	+10	6	8	+2	57	75	+18
N	158	201	+43	10.5	17.8	+7.3	10	11	+1	85	90	+5	4	7	+3	50	63	+13
O	138	153	+15	6.8	10.7	+3.9	9	10	+1	N.R.	78	----	4	5	+1	40	50	+10
State median	140	169	+29	6.5	11.2	+4.7	9	11	+2	73	88	+15	4	6	+2	45	63	+18
Standard median	110	110	----	9.4	9.4	------	8	8	------	77—	82	----	7	7	------	64	64	----

Grade 4

VI						VII						VIII					
a			b			a			b			a			b		
October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference
2	4	+2	0	40	+40	1	3	+2	0	33	+33	N.R.	N.R.	------	N.R.	N.R.	------
3	5	+2	33	53	+20	4	5	+1	0	61	+61	N.R.	3	------	N.R.	64	------
4	5	+1	33	38	+5	5	4	+1	40	40	0	N.R.	------	------	N.R.	0	------
2.5	4	+1.5	13	50	+37	N.R.	4	----	N.R.	41	------	N.R.	------	------	N.R.	0	------
3	5	+2	39	60	+21	------	3	+3	0	33	------	0	2	+2	0	0	0
4	6	+2	44	75	+31	2	6	+4	60	63	+3	N.R.	4	------	N.R.	50	------
3	8	+5	40	86	+46	1	5	+4	0	80	+80	2.5	5	+2.5	33	75	+42
6	8	+2	43	64	+21	2	6	+4	0	67	+67	N.R.	4	------	N.R.	38	------
4	5	+1	67	80	+13	2	5	+3	0	60	+60	N.R.	1	------	N.R.	0	------
4	4.5	+0.5	29	37	+8	0.5	3.5	+3	0	37	+37	0.5	------	—0.5	0	0	0
6	10	+4	60	80	+20	4	7	+3	40	73	+33	0	7	+7	0	86	+86
5	8	+3	50	83	+33	3	6	+3	33	71	+38	2	5	+3	0	67	+67
4	6	+2	33	56	+23	3	5	+2	33	50	+17	2	3	+1	25	40	+15
4	5	+1	39	60	+21	2	5	+3	0	60	+60	2	3	+1	0	40	+40
7	7	------	80	80	------	6	6	----	67	67	------	5	5	------	57	57	------

TABLE A3—

	I			II			III			IV			V					
													a			b		
	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference
A	179	206	+27	9.2	14.6	+5.4	10	11	+1	56	68	+12	4	5	+1	20	43	+23
B	166	179	+13	13.0	16.3	+3.3	8	13	+4	86	96	+10	5	6	+1	50	55	+5
D	154	161	+7	8.6	12.4	+3.8	11	12	+1	57	62	+5	4	5	+1	43	50	+7
E	105	158	+53	7.1	9.2	+2.1	8	10	+2	56	86	+30	3	5	+2	33	50	+17
F	162	179	+17	11.0	14.3	+3.3	10	12	+2	51	60	+9	4	6	+2	40	67	+27
G	293	231	—62	16.3	20.3	+4.0	11	12.5	+1.5	84	95	+11	6	6.5	+0.5	40	57	+17
I	193	186	—7	15.6	17.3	+1.7	11	12	+1	78	88	+10	7	7	0	66	75	+9
J	228	239	+11	12.7	16.3	+3.6	11	11	0	74	90	+16	6	8	+2	56	70	+14
K	158	325	+167	N.R.	20.2	------	13	12	—1	86	96	+10	5	9	+4	60	60	0
L	82	106	+24	2.5	6.2	+3.7	6	9	+3	24	53	+29	4	5	+1	25	60	+35
M	138	183	+45	12.2	16.3	+4.1	11	11	0	74	82	+8	7	8	+1	67	69	+2
N	188	206	+18	14.9	19.5	+4.6	12	13	+1	82	88	+6	4	8	+4	50	71	+21
O	181	164	—17	11.6	13.8	+2.2	10	12	+2	72	74	+2	6	6	0	50	55	+5
State median	162	183	+21	11.8	16.3	+4.5	11	12	+1	74	86	+12	5	6	+1	50	60	+10
Standard median	130	130	------	13.4	13.4	------	10	10	------	77—	82	----	9	9	------	70	70	----

Grade 5

VI						VII						VIII					
a			b			a			b			a			b		
October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference
3	5	+2	0	40	+40	3	5	+2	0	40	+40	1	3	+2	0	33	+33
5	6	+1	60	73	+13	4	5.5	+1.5	33	69	+36	3	4	+1	33	59	+26
6	6	0	44	67	+23	4	5	+1	33	57	+24	2	4	+2	25	50	+25
4	5	+1	40	43	+3	2	4	+2	25	50	+25	0	3	+3	0	33	+33
6	6	0	40	80	+40	3	5	+2	25	60	+35	2	2	0	0	33	+33
6	7.5	+1.5	40	73	+33	6	5.5	—0.5	63	60	—3	3	4	+1	40	75	+35
7	8	+1	83	86	+3	5	6	+1	60	80	+20	4	6	+2	75	100	+25
6	8	+2.0	50	78	+28	3	8	+5	33	75	+42	3	5	+2	33	67	+34
6	9	+3	40	78	+38	3	9	+6	40	67	+27	1	6	+5	0	63	+63
3.5	5	+1.5	25	50	+25	3	5	+2	38	38	0	1	3	+2	0	25	+25
8	9	+1	67	79	+12	7	7	0	63	86	+23	5	8	+3	67	100	+33
6	9	+3	71	86	+15	5	7	+2	57	80	+23	3	7	+4	50	83	+33
5	7	+2	50	64	+14	5	7	+2	40	67	+27	3	4	+1	33	67	+34
6	7	+1	44	73	+29	3	5.5	+2.5	38	67	+29	3	4	+1	33	63	+30
9	9	------	83	83	------	8	8	------	75	75	------	6	6	------	77	77	------

TABLE A4—

	I			II			III			IV			V					
													a			b		
	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference
A	188	220	+32	12.3	14.5	+2.2	11	12	+1	67	59	—8	5	6	+1	50	60	+10
B	239	187	—52	12.1	15.4	+3.3	11.5	14	+2.5	70	82	+12	5	6	+1	25	53	+28
D	120	216	+96	8.7	13.4	+4.7	12	12	0	64	70	+6	5	6	+1	50	67	+17
E	157	147	—10	7.5	13.4	+5.9	10	12.5	+2.5	44	54	+10	4	3	—1	33	50	+17
F	275	209	—66	10.3	13.4	+3.1	12	13	+1	86	66	—20	6	7	+1	67	80	+13
G	201	205	+4	11.5	15.9	+4.4	11	12	+1	76	72	—4	7	8	+1	50	70	+20
I	200	260	+60	10.5	14.5	+4.0	12	14	+2	98	90	—8	7	6	—1	75	73	—2
J	179	220	+41	10.4	12.8	+2.4	12	13	+1	83	85	+2	6	8	+2	54	65	+11
K	203	294	+91	13.0	11.2	—1.8	11	12	+1	80	78	—2	5	6	+1	55	50	—5
L	143	189	+46	6.7	10.7	+4.0	9	12	+3	56	84	+28	4	7	+3	33	42	+9
M	127	218	+91	9.0	10.6	+1.6	11	13	+2	77	84	+7	6	8	+2	67	86	+19
N	240	260	+20	13.2	19.5	+6.3	13	15	+2	84	88	+4	7	10	+3	71	71	0
O	216	208	—8	11.0	13.9	+2.9	12	12	0	76	68	—8	6	6	0	43	60	+17
State median	200	218	+18	11.2	13.4	+2.2	12	12.5	+0.5	76	78	+2	6	6	0	54	65	+11
Standard median	160	160	----	13.8	13.8	------	11	11	------	77—	82	----	10	10	----	73	73	----

GRADE 6

VI						VII						VIII					
a			b			a			b			a			b		
October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference
6	6	0	67	65	—2	5	6	+1	50	60	+10	4	4	0.0	50	69	+19
6	8	+2	59	60	+1	5	6.5	+1.5	37	47	+10	3	4.5	+1.5	25	62	+37
6	6	0	50	67	+17	5	6	+1	48	60	+12	3	4	+1	50	67	+17
5	5	0	60	43	—17	4	3	—1	25	33	+8	3	3	0	40	33	—7
6	8	+2	80	100	+20	5	8	+3	71	89	+18	4	7	+3	67	100	+33
6	8	+2	50	75	+25	6	6	0	62	80	+18	4.5	4	—0.5	71	67	—4
7	8	+1	71	85	+14	6	6	0	71	83	+12	6	7	+1	83	100	+17
5	9	+4	44	69	+25	5	7.5	+2.5	40	62	+22	4	6	+1	40	63	+23
6	9	+3	65	67	+2	6	7	+1	59	77	+18	3.5	7	+3.5	55	78	+23
4	7	+3	43	42	—1	5	6	+1	40	42	+2	2	2	0	0	0	0
7	8	+1	86	100	+14	8	10	+2	71	100	+29	6	9	+3	89	100	+11
8	11	+3	75	85	+10	6	11	+5	67	80	+13	6	9	+3	75	89	+14
7	8	+1	63	67	+4	6	7	+1	50	60	+10	4	5	+1	50	71	+21
6	8	+2	60	67	+7	5	6.5	+1.5	50	62	+12	4	5	+1	50	69	+19
10	10	------	85	85	------	9	9	------	78	78	------	8	8	------	87	87	------

TABLE A5—

	I			II			III			IV			V					
													a			b		
	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference
A	178	287	+109	16.2	21.0	+4.8	12	14	+2	74	72	—2	7	7	0.0	57	50	—7
B	194	199	+5	16.1	19.8	+3.7	13	14.5	+1.5	92	92	0	7	8.5	+1.5	59	52	—7
D	184	242	+58	9.1	18.1	+9.0	12	13	+1	62	70	+8	7	7.0	0	63	----	0
E	181	312	+131	11.8	14.2	+2.4	8	11	+3	34	40	+6	4	4.0	0	45	50	+5
F	195	243	+48	29.3	27.5	—1.8	13	13.5	+0.5	68	77	+9	7	7.5	+0.5	65	85	+20
G	278	274	—4	15.0	17.0	+2.0	13	17.5	+4.5	87	75	—12	7	8	+1.0	60	59	—1
I	184	210	+26	8.1	17.2	+9.1	12	13.5	+1.5	83	83	0	8	8	0	71	70	—1
J	223	259	+36	13.4	19.3	+5.9	13	14	+1	85	92	+7	6.5	8	+1.5	56	75	+19
K	187	241	+54	13.8	24.7	+10.9	13	14	+1.0	86	88	+2	7	8	+1.0	67	66	—1
L	200	253	+53	16.2	17.8	+1.6	9.5	12	+2.5	56	88	+32	4	6	+2.0	43	43	0
M	202	164	—38	N.R.	13.0	------	12	15	+3	92	94	+2	8.5	8	—0.5	65	80	—5
N	256	261	+5	18.4	26.3	+7.9	14	16	+2	90	90	0	8	12	+4.0	73	80	+7
O	238	256	+18	16.1	18.7	+2.6	13	14	+1	84	78	—6	7	7	0	63	63	0
State median	200	253	+53	15	18.7	+3.7	12	14	+2	84	83	—1	7	8	+0.5	60	63	+3
Standard median	185	185	------	16.5	16.5	------	12	12	------	79—	84	----	11	11	------	75	75	----

Grade 7

VI						VII						VIII					
a			b			a			b			a			b		
October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference
7	8.0	+1	71	67	—4	6.0	7	+1.0	41	69	+28	4.0	5.5	+1.5	50	71	+21
8	10	+2	60	70	+10	6.5	9	+2.5	53	60	+7	6	8	+2	75	74	—1
7	8	+1	60	78	+18	5	7	+2	50	80	+30	5	6	+1	67	75	+8
6	6.5	+0.5	88	89	+ 1	4.5	3	—1.5	64	50	—14	4.5	3	—1.5	65	33	—32
8	9.5	+1.5	64	90	+26	6	8	+2	62	77	+15	3.5	8	+4.5	80	81	+1
9	10	+1	79	69	—10	8.5	8	—0.5	71	64	—7	7	8	+1	79	82	+3
10	10	0	75	83	+8	6	10	+4	75	67	—8	6	6	0	86	100	+14
8	9	+1	86	91	+5	7	9	+2	69	85	+16	5	3	—2	75	100	+25
7	11	+4.5	59	85	+26	9	9.5	+0.5	75	77	+2	6	10	+4	80	85	+5
5	8	+3	50	57	+7	4	7	+3	33	50	+17	3	4	+1	33	50	+17
8.5	8	—0.5	80	86	+6	8	7	—1	65	78	+13	7	7	0	80	100	+20
10	13	+3	80	86	+6	8	12	+4	72	83	+11	8	12	+4	88	91	+3
8	9	+1	71	78	+7	7	7	0	67	71	+4	7	7	0	75	75	0
8	9	+1	71	83	+12	7	8	+1	65	71	+6	6	7	+1	75	81	+6
12	12	------	86	86	------	10	10	------	80	80	------	10	10	------	90	90	------

COMMENT ON THE GRADE TABLES

These results clearly show how necessary it is to consider the time of year when any given grade is tested when making any judgment as to the standing of that grade. To estimate the work of a class on the basis of fall tests alone or on spring tests alone is not fair either to the pupils or to the teacher.

All the grades made improvement in their scores in practically all subjects in practically all the systems. This is to be expected. The question for teachers to ask themselves is, how much this was due to their efforts and how much to the increased maturity of the children in their classes. Where an unusual increase in the score appears, the teacher can undoubtedly claim some credit for using better or more intensive methods of teaching.

One of the very remarkable features of these results does not appear in these published tables, but in the tabulation of the individual results. The range of ability is much smaller and the amount of improvement made by some few individuals is almost beyond belief. Were it not that we have personal knowledge of the amount of individual work done by some of the teachers, we would question seriously the accuracy of the results.

There is no doubt that the teachers in all grades need to adopt better methods of teaching arithmetic. While the scores in all grades show improvement through the year, yet the absolute quality of work done in the four fundamental processes, no matter which grade is considered, is very poor.

It is of course gratifying to see the progress made during the year in all grades. There is little falling off in the scores and in some cases very marked improvement. Teachers will be interested to compare these May results with the results this coming fall as concerns the same class of pupils who are in a higher grade. For the teacher, however, the most important feature will be the study of individual improvement.

The Subject-Matter Tables

The next set of tables, designated B^1, B^2, etc., will give a cross-section of the scores made in the different subjects, grade by grade. They will indicate also the amount of improvement made in the May series of tests over the October series.

TABLE B1—SPEED READING

	Grade 4			Grade 5			Grade 6			Grade 7		
	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference
A	117	173	+56	179	206	+27	188	220	+32	178	287	+109
B	152	164	+12	166	179	+13	239	187	—52	194	199	+5
D	140	206	+66	154	161	+7	120	216	+96	184	242	+58
E	69	164	+95	105	158	+53	157	147	—10	181	312	+131
F	132	169	+37	162	179	+17	275	209	—66	195	243	+48
G	144	194	+50	293	231	—62	201	205	+4	278	274	—4
I	143	170	+27	193	186	—7	200	260	+60	184	210	+26
J	156	197	+41	228	239	+11	179	220	+41	223	259	+36
K	172	169	—3	158	325	+167	203	294	+91	187	241	+54
L	56	137	+81	82	106	+24	143	189	+46	200	253	+53
M	127	157	+30	138	183	+45	127	218	+91	202	164	—38
N	158	201	+43	188	206	+18	240	260	+20	256	261	+5
O	138	153	+15	181	164	—17	216	208	—8	238	256	+18
State median	140	169	+29	162	183	+21	200	218	+18	200	253	+53
Standard median	110	110	------	130	130	------	160	160	------	185	185	------

TABLE B2—SENSE READING

	Grade 4			Grade 5			Grade 6			Grade 7		
	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference
A	4.2	6.8	+2.6	9.2	14.6	+5.4	12.3	14.5	+2.2	16.2	21.0	+4.8
B	6.5	12.0	+5.5	13.0	16.3	+3.3	12.1	15.4	+3.3	16.1	19.8	+3.7
D	4.9	11.4	+6.5	8.6	12.4	+3.8	8.7	13.4	+4.7	9.1	18.1	+9.0
E	1.2	2.4	+1.2	7.1	9.2	+2.1	7.5	13.4	+5.9	11.8	14.2	+2.4
F	6.4	9.1	+2.7	11.0	14.3	+3.3	10.3	13.4	+3.1	29.3	27.5	—1.8
G	8.5	9.8	+1.3	16.3	20.3	+4.0	11.5	15.9	+4.4	15.0	17.0	+2.0
I	6.5	11.2	+4.7	15.6	17.3	+1.7	10.5	14.5	+4.0	8.1	17.2	+9.1
J	7.5	12.2	+4.7	12.7	16.3	+3.6	10.4	12.8	+2.4	13.4	19.3	+5.9
K	N.R.	11.2	------	N.R.	20.2	------	13.0	11.2	—1.8	13.8	24.7	+10.9
L	2.6	5.4	+2.8	2.5	6.2	+3.7	6.7	10.7	+4.0	16.2	17.8	+1.6
M	9.1	12.1	+3.0	12.2	16.3	+4.1	9.0	10.6	+1.6	N.R.	13.0	------
N	10.5	17.8	+7.3	14.9	19.5	+4.6	13.2	19.5	+6.3	18.4	26.3	+7.9
O	6.8	10.7	+3.9	11.6	13.8	+2.2	11.0	13.9	+2.9	16.1	18.7	+2.6
State median	6.5	11.2	+4.7	11.8	16.3	+4.5	11.2	13.4	+2.2	15.0	18.7	+3.7
Standard median	9.4	9.4	------	13.4	13.4	------	13.8	13.8	------	16.5	16.5	------

TABLE B3—LANGUAGE

	Grade 4			Grade 5			Grade 6			Grade 7		
	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference
A	8.0	9	+1.0	10	11.0	+1.0	11.0	12.0	+1.0	12.0	14.0	+2.0
B	9.0	13	+4	8	13	+4	11.5	14	+2.5	13	14.5	+1.5
D	8	10	+2	11	12	+1	12	12	+0	12	13	+1
E	6	8	+2	8	10	+2	10	12.5	+2.5	8	11	+3
F	10	11	+1	10	12	+2	12	13	+1	13	13.5	+0.5
G	11	11	+0	11	12.5	+1.5	11	12	+1	13	17.5	+4.5
I	9	11	+2	11	12	+1	12	14	+2	12	13.5	+1.5
J	9	10	+1	11	11	+0	12	13	+1	13	14	+1
K	8	11	+3	13	12	—1	11	12	+1	13	14	+1
L	6	9	+3	6	9	+3	9	12	+3	9.5	12	+2.5
M	9.5	11	+1.5	11	11	+0	11	13	+2	12	15	+3
N	10	11	+1	12	13	+1	13	15	+2	14	16	+2
O	9	10	+1	10	12	+2	12	12	+0	13	14	+1
State median	9	11	+2	11	12	+1	12	12.5	+0.5	12	14	+2
Standard median	8	8	------	10	10	------	11	11	------	12	12	------

TABLE B4—SPELLING

	Grade 4			Grade 5			Grade 6			Grade 7		
	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference
A	70	61	—9	56	68	+12	67	59	—8	74	72	—2
B	74	96	+22	86	96	+10	70	82	+12	92	92	0
D	52	66	+14	57	62	+5	64	70	+6	62	70	+8
E	52	64	+12	56	86	+30	44	54	+10	34	40	+6
F	72	72	0	51	60	+9	86	66	—20	68	77	+9
G	90	90	0	84	95	+11	76	72	—4	87	75	—12
I	72	88	+16	78	88	+10	98	90	—8	83	83	0
J	76	92	+16	74	90	+16	83	85	+2	85	92	+7
K	78	92	+14	86	96	+10	80	78	—2	86	88	+2
L	67	66	—1	24	53	+29	56	84	+28	56	88	+32
M	77	88	+10	74	82	+8	77	84	+7	92	94	+2
N	95	90	+5	82	88	+6	84	88	+4	90	90	0
O	N.R.	78	------	72	74	+2	76	68	—8	84	78	—7
State median	73	88	+15	74	86	+12	76	78	+2	84	83	—1
Standard median	77—	82	------	77—	82	------	77—	82	------	79—	84	------

TABLE B5—ADDITION (SPEED)

	Grade 4			Grade 5			Grade 6			Grade 7		
	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference
A	4.0	4.0	0.0	4.0	5.0	+1.0	5.0	6.0	+1.0	7.0	7.0	0.0
B	5	4.5	—0.5	5	6	+1	5	6	+1	7	8.5	+1.5
D	4	5	+1	4	5	+1	5	6	+1	7	7	0
E	3.5	4	+0.5	3	5	+2	4	3	—1	4	4	0
F	3	6	+3	4	6	+2	6	7	+1	7	7.5	+0.5
G	3	6	+3	6	6.5	+0.5	7	8	+1	7	8	+1
I	5	6	+1	7	7	0	7	6	—1	8	8	0
J	6	10	+4	6	8	+2	6	8	+2	6.5	8	+1.5
K	4	6	+2	5	9	+4	5	6	+1	7	8	+1
L	3.5	4	+0.5	4	5	+1	4	7	+3	4	6	+2
M	6	8	+2	7	8	+1	6	8	+2	8.5	8	—0.5
N	4	7	+3	4	8	+4	7	10	+3	8	12	+4
O	4	5	+1	6	6	0	6	6	0	7	7	0
State median	4	6	+2	5	6	+1	6	6	0	7	8	+1
Standard median	7	7	------	9	9	------	10	10	------	11	11	------

TABLE B5—ADDITION (ACCURACY)

	Grade 3			Grade 4			Grade 5			Grade 6			Grade 7		
	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference
A	0	33	+33	0	43	+43	20	43	+23	50	60	+10	57	50	—7
B	N.R.	N.R.	N.R.	20	42	+22	50	55	+5	25	53	+28	59	52	—7
D	------	------	------	33	44	+10	43	50	+7	50	67	+17	63	63	0
E	------	------	------	29	75	+46	33	50	+17	33	50	+17	45	50	+5
F	------	------	------	33	60	+27	40	67	+27	67	80	+13	65	85	+20
G	N.R.	40	------	50	50	0	40	57	+17	50	70	+20	60	59	—1
I	------	------	------	67	71	+4	66	75	+9	75	73	—2	71	70	—1
J	33	40	+7	56	80	+24	56	70	+14	54	65	+11	56	75	19
K	N.R.	66	------	60	66	+6	60	60	0	55	50	—5	67	66	—1
L	N.R.	N.R.	------	50	33	—17	25	60	+35	33	42	+9	43	43	0
M	N.R.	71	------	57	75	+18	67	69	+2	67	86	+19	65	80	+15
N	N.R.	N.R.	------	50	63	+13	50	71	+21	71	71	0	73	80	+7
O	N.R.	N.R.	------	40	50	+10	50	55	+5	43	60	—17	63	63	0
State median	------	------	------	45	63	+18	50	60	+10	54	65	+11	60	63	+3
Standard median	------	------	------	64	64	-----	74	70	-----	73	73	-----	75	75	-----

TABLE B7—SUBTRACTION (SPEED)

	Grade 4			Grade 5			Grade 6			Grade 7		
	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference
A	2.0	4.0	+2.0	3.0	5.0	+2.0	6.0	6.0	+0.0	7.0	8.0	+1.0
B	3	5	+2	5	6	+1	6	8	+2	8	10	+2
D	4	5	+1	6	6	0	6	6	0	7	8	+1
E	2.5	4	+1.5	4	5	+1	5	5	0	6	6.5	+0.5
F	3	5	+2	6	6	0	6	8	+2	8	9.5	+1.5
G	4	6	+2	6	7.5	+1.5	6	8	+2	9	10	+1
I	3	8	+5	7	8	+1	7	8	+1	10	10	0
J	6	8	+2	6	8	+2	5	9	+4	8	9	+1
K	4	5	+1	6	9	+3	6	9	+3	7	11.5	+4.5
L	4	4.5	+0.5	3.5	5	+1.5	4	7	+3	5	8	+3
M	6	10	+4	8	9	+1	7	8	+1	8.5	8	—0.5
N	5	8	+3	6	9	+3	8	11	+3	10	13	+1
O	4	6	+2	5	7	+2	7	8	+1	8	9	+1
State median	4	5	+1	6	7	+1	6	8	+2	8	9	+1
Standard median	7	7	------	9	9	------	10	10	------	12	12	------

TABLE B8—SUBTRACTION (ACCURACY)

	Grade 4			Grade 5			Grade 6			Grade 7		
	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference
A	0	40	+40	0	40	+40	67	65	—2	71	67	—4
B	33	53	+20	60	73	+13	59	60	+1	60	70	+10
D	33	38	+5	44	67	+23	50	67	+17	60	78	+18
E	13	50	+37	40	43	+3	60	43	—17	88	89	+1
F	39	60	+21	40	80	+40	80	100	+20	64	90	+26
G	44	75	+31	40	73	+33	50	75	+25	79	69	—10
I	40	86	+46	83	86	+3	71	85	+14	75	83	+8
J	43	64	+21	50	78	+28	44	69	+25	86	91	+5
K	67	80	+13	40	78	+38	65	67	+2	59	85	+26
L	29	37	+8	25	50	+25	43	42	—1	50	57	+7
M	60	80	+20	67	79	+12	86	100	+14	80	86	+6
N	50	83	+33	71	86	+15	75	85	+10	80	86	+6
O	33	56	+23	50	64	+14	63	67	+4	71	78	+7
State median	39	60	+21	44	73	+29	60	67	+7	71	83	+12
Standard median	80	80	------	83	83	------	85	85	------	86	86	------

TABLE B9—MULTIPLICATION (SPEED)

	Grade 4			Grade 5			Grade 6			Grade 7		
	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference
A	1.0	3.0	+2.0	3.0	5.0	+2.0	5.0	6.0	+1.0	6.0	7.0	+1.0
B	4	5	+1	4	5.5	+1.5	5	6.5	+1.5	6.5	9	+2.5
D	5	4	+1	4	5	+1	5	6	+1	5	7	+2
E	N.R.	4	N.R.	2	4	+2	4	3	—1	4.5	3	—1.5
F	0	3	+3	3	5	+2	5	8	+3	6	8	+2
G	2	6	+4	6	5.5	—0.5	6	6	0	8.5	8	—0.5
I	1	5	+4	5	6	+1	6	6	0	6	10	+4
J	2	6	+4	3	8	+5	5	7.5	+2.5	7	9	+2
K	2	5	+3	3	9	+6	6	7	+1	9	9.5	+0.5
L	0.5	3.5	+3	3	5	+2	5	6	+1	4	7	+3
M	4	7	+3	7	7	0	8	10	+2	8	7	—1
N	3	6	+3	5	7	+2	6	11	+5	8	12	+4
O	3	5	+2	5	7	+2	6	7	+1	7	7	0
State median	2	5	+3	3	5.5	+2.5	5	6.5	+1.5	7	8	+1
Standard median	6	6	------	8	8	------	9	9	------	10	10	------

TABLE B10—MULTIPLICATION (ACCURACY)

	Grade 4			Grade 5			Grade 6			Grade 7		
	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference
A	0	33	+33	0	40	+40	50	60	+10	41	69	+28
B	0	61	+61	33	69	+36	37	47	+10	53	60	+7
D	40	40	0	33	57	+24	48	60	+12	50	80	+30
E	N.R.	41	N.R.	25	50	+25	25	33	+8	64	50	—14
F	0	33	+33	25	60	+35	71	89	+18	62	77	+15
G	60	63	+3	63	60	—3	62	80	+18	71	64	—7
I	0	80	+80	60	80	+20	71	83	+12	75	67	—8
J	0	67	+67	33	75	+42	40	62	+22	69	85	+16
K	0	60	+60	40	67	+27	59	77	+18	75	77	+2
L	0	37	+37	38	38	0	40	42	+2	33	50	+17
M	40	73	+33	63	86	+23	71	100	+29	65	78	+13
N	33	71	+38	57	80	+23	67	80	+13	72	83	+11
O	33	50	+17	40	67	+27	50	60	+10	67	71	+4
State median	0	60	+60	38	67	+29	50	62	+12	65	71	+6
Standard median	67	67	------	75	75	------	78	78	------	80	80	------

TABLE B11—DIVISION (SPEED)

	Grade 4			Grade 5			Grade 6			Grade 7		
	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference
A	N.R.	N.R.	N.R.	1.0	3.0	+2.0	4.0	4.0	0.0	4.0	5.5	+1.5
B	N.R.	3	+3	3	4	+1	3	4.5	+1.5	6.0	8	+2
D	N.R.	1	N.R.	2	4	+2	3	4	+1	5	6	—1
E	N.R.	0	N.R.	0	3	+3	3	3	0	4.5	3	—1.5
F	------	2	+2	2	2	0	4	7	+3	3.5	8	+4.5
G	N.R.	4	------	3	4	+1	4.5	4	—0.5	7	8	+1
I	2.5	5	+2.5	4	6	+2	6	7	+1	6	6	0
J	N.R.	4	------	3	5	+2	4	6	+1	5	3	—2
K	N.R.	1	------	1	6	+5	3.5	7	+3.5	6	10	+4
L	0.5	0	—0.5	1	3	+2	2	2	0	3	4	+1
M	------	7	+7	5	8	+3	6	9	+3	7	7	0
N	2	5	+3	3	7	+4	6	9	+3	8	12	+4
O	2	3	+1	3	4	+1	4	5	+1	7	7	0
State median	2	3	+1	3	4	+1	4	5	+1	6	7	+1
Standard median	5	5	------	6	6	------	8	8	------	10	10	------

TABLE B12—DIVISION (ACCURACY)

	Grade 4			Grade 5			Grade 6			Grade 7		
	October	May	Difference	October	May	Difference	October	May	Difference	October	May	Difference
A	N.R.	N.R.	N.R.	0	33	+33	50	69	+19	50	71	+21
B	64	N.R.	N.R.	33	59	+26	25	62	+37	75	74	—1
D	N.R.	0	N.R.	25	50	+25	50	67	+17	67	75	+8
E	N.R.	0	N.R.	0	33	+33	40	33	—7	65	33	—32
F	0	0	0	0	33	+33	67	100	+33	80	81	+1
G	N.R.	50	------	40	75	+35	71	67	—4	79	82	+3
I	33	75	+42	75	100	+25	83	100	+17	86	100	+14
J	N.R.	38	------	33	67	+34	40	63	+23	75	100	+25
K	N.R.	0	------	0	63	+63	55	78	+23	80	85	+5
L	0	0	0	0	25	+25	0	0	0	33	50	+17
M	0	86	+86	67	100	+33	89	100	+11	80	100	+20
N	0	67	+67	50	83	+33	75	89	+14	88	91	+3
O	25	40	+15	33	67	+34	50	71	+21	75	75	0
State median	0	40	+40	33	63	+30	50	69	+19	75	81	+6
Standard median	57	57	------	77	77	------	87	87	------	90	90	------

COMMENT ON THE SUBJECT-MATTER TABLES

As in the Grade Tables, general improvement is noted all through these Subject-Matter Tables. It is particularly gratifying to note that the arithmetic scores are much better, although there is still very great opportunity for improvement here. Pupils must learn to work with much greater speed and with a very much higher degree of accuracy. There is a moral as well as an educational value in developing a habit of thinking that what is almost right is wrong.

The amount of improvement made during the year in the scores for interpretative reading is most gratifying. The October results showed a most unfortunate condition in respect to the ability of children to understand what they read. The year's work has evidently resulted in a marked improvement along this line, and shows that the teachers have realized the weakness sufficiently to result in their paying successful attention to the problem.

Spelling, also, has made most notable improvement during the year, the scores indicating that this subject is now being taught with a very high degree of success. The problem of the teachers will now be one of keeping the work up to the high standard already set.

These tables and those giving the individual scores ought to be very suggestive to the teachers in their future efforts to raise the quality of work in their classes and to attend to the needs of individual pupils in their classes.

The Summary Table

The summary table given below needs no comment other than to point out how much nearer the median scores for the State approach the standard scores than they did in the October series of tests. A better balance or closer grouping of the scores through all grades and in all subjects is noticeable throughout this set of tests from the individual scores through the summary table.

TABLE C—SUMMARY TABLE

	I		II		III		IV		V			
									a		b	
	N.C.	U.S.	N.C.	U.S.	N.C.	U.S.	N.C.	U.S.	N.C.	U.S.	N.C.	U.S.
Grade 4	169	110	11.2	9.4	11	8	88	82	6	7	63	64
Grade 5	183	130	16.3	13.4	12	10	86	82	6	9	60	70
Grade 6	218	160	13.4	13.8	12.5	11	78	82	6	10	65	73
Grade 7	253	185	18.7	16.5	14	12	83	84	8	11	63	75

	VI				VII				VIII			
	a		b		a		b		a		b	
	N.C.	U.S.	N.C.	U.S.	N.C.	U.S.	N.C.	U.S.	N.C.	U.S.	N.C.	U.S.
Grade 4	5	7	60	80	5	6	60	67	3	5	40	57
Grade 5	7	9	73	83	5.5	8	67	75	4	6	63	77
Grade 6	8	10	67	85	6.5	9	62	78	5	8	69	87
Grade 7	9	12	83	86	8	10	71	80	7	10	81	90

The Table of Improvement Scores

The table which follows is added for the purpose of showing the range of improvement scores made by each grade in the different subjects. There is no thought that it shall be used as a standard except in a very general way to give teachers and superintendents some idea as to what amount of improvement is possible during a school year. The rubrics used have the same meaning as in the other tables. The capital letters L, M, and H, stand for the lowest, median, and highest, amount of improvement, respectively.

TABLE D—IMPROVEMENT

	I			II			III			IV		
	L	M	H	L	M	H	L	M	H	L	M	H
Grade 4	−3	+29	+95	+1.2	+4.7	+7.3	0.0	+2.0	+4	−9	+15	+22
Grade 5	−62	+21	+67	+1.7	+4.5	+5.4	−1	+1	+4	+2	+12	+30
Grade 6	−66	+18	+96	−1.8	+2.2	+6.3	0	+0.5	+3	−20	+2	+28
Grade 7	−38	+53	+131	−1.8	+3.7	+10.9	+0.5	+2	+4.5	−12	−1	+32

	V						VI					
	a			b			a			b		
	L	M	H	L	M	H	L	M	H	L	M	H
Grade 4	−0.5	+2	+4	−17	+18	+46	+0.5	+1	+5	+5	+21	+46
Grade 5	0	+1	+4	0	+10	+35	0	+1	+3	+3	+29	+40
Grade 6	−1	0	+3	−17	+11	+28	0	+2	+4	−17	+7	+25
Grade 7	−0.5	+5	+4	−7	+3	+20	+0.5	+1	+4.5	−10	+12	+26

	VII						VIII					
	a			b			a			b		
	L	M	H	L	M	H	L	M	H	L	M	H
Grade 4	+1.0	+3.0	+4.0	0	+60	+80	+0.5	+1	+7.0	0	+40	+86
Grade 5	+0.5	+2.5	+6	−3	+29	+42	0	+1	+5	+25	+30	+63
Grade 6	−1.0	+1.5	+5.0	+2	+12	+29	−0.5	+1	+3.5	−7	+19	+37
Grade 7	−1.5	+1	+4	−14	+6	+30	−1.5	+1	+4.5	−32	+6	+25

COMMENT ON IMPROVEMENT TABLE

By far the greatest amount of improvement is shown in the accuracy with which the fundamental processes in arithmetic are done. It is well to remember, however, that in the first series of tests these scores were unduly low, and hence a very much greater amount of improvement is to be expected.

There is, too, a very commendable improvement in the rate of working in arithmetic. While the comment as to the possibility of improvement in this case is not quite so applicable as in the case of accuracy, it still holds good.

Taken by and large, it appears that the fourth grade makes more rapid improvement than any other grade. This is particularly noticeable in the arithmetic scores.